



WinSmartEV: Smart EV Charging and Grid Integration

Tech ID: 23787 / UC Case 2010-903-0

SUMMARY

UCLA researchers in the Department of Mechanical and Aerospace Engineering have developed a platform to monitor and control an electric vehicle's (EV's) battery interaction with the Smart Grid.

BACKGROUND

EV technology has seen dramatic innovations in recent years due to advances in both battery and digital communication technologies and a growing public awareness of green energy. However, the current electrical power infrastructure needs major upgrading in capacity and control flexibility in order to meet the needs of tomorrow's EVs. Adding capacity is far more expensive than adding intelligent power routing capabilities.

With the increase in EVs on the road, the potential exists to aggregate the energy in their batteries to create an energy storage buffer to absorb excess power during low-load periods such as during the night and become a source of electrical power during high-load periods such as a summer afternoon.

INNOVATION

Researchers at UCLA have developed an interactive wireless platform that optimizes EV battery charging and backfill with the Smart Grid in order to simultaneously meet the demands of drivers and the electric utility providers.

APPLICATIONS

- ▶ Management of EV battery charge and sell back.
- ▶ Direct and up-to-the-minute information for service providers on customer battery status and charge profiles.

ADVANTAGES

- ▶ Allows the current infrastructure to sustain more EVs.
- ▶ Helps electric utility providers with the critical problem of Demand Response.
- ▶ Lowers overall costs for electric service providers by having access to aggregate EV energy at high demand times.
- ▶ Lowers costs for the consumer by allowing charging at low demand times.

STATE OF DEVELOPMENT

The WinSmartEV platform has been tested for basic functionality and usability. It will be pilot tested at the UCLA campus using a number of charging stations and data will be collected from the UCLA EV Fleet for technical evaluation.

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	9,026,347	05/05/2015	2010-903

CONTACT

UCLA Technology Development Group
ncd@tdg.ucla.edu
tel: 310.794.0558.



INVENTORS

- ▶ Gadh, Rajit

OTHER INFORMATION

KEYWORDS

Smart Grid, grid capacity, electric vehicle, electric vehicle battery, demand response

CATEGORIZED AS

- ▶ **Energy**
 - ▶ Storage/Battery
- ▶ **Sensors & Instrumentation**
 - ▶ Process Control
- ▶ **Transportation**
 - ▶ Automotive

RELATED CASES

2010-903-0

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- ▶ [Battery Energy Storage Control System](#)
- ▶ [Architecture and Level 2 Variable Power Control Scheme](#)

UCLA Technology Development Group

10889 Wilshire Blvd., Suite 920, Los Angeles, CA 90095

tdg.ucla.edu

Tel: 310.794.0558 | Fax: 310.794.0638 | ncd@tdg.ucla.edu

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